



ePayroll Mobile App

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Executive Summary

Pennsylvania Department of Transportation (PennDOT) maintenance crews are a common sight on the commonwealth's 40,000 roadway miles and 25,000 bridges, handling day-to-day tasks such as road surface treatment, shoulder cutting and grading, pipe replacing and cleaning, mechanized and manual patching, joint and crack sealing, vegetation management, line painting, bridge maintenance and cleaning, signing and winter operations valued at \$858 million annually.

Each day, PennDOT's 1,500 Highway Maintenance Foremen submit detailed reports on the work completed by approximately 5,000 crew members on the daily payroll. These reports, known as ePayrolls, are a complex combination of work orders, equipment, materials and supplies used to maintain roadways. These resources must be closely tracked in the commonwealth's enterprise resource planning (ERP) system, which is the financial system of record.

The ePayroll Mobile App was developed to provide a consistent, automated, and simplified tool for PennDOT Highway Maintenance Foremen to enter, edit, and submit ePayroll data from a mobile device (Apple iPad) directly into the ERP system while working in the field. Previously, foremen were required to enter ePayrolls into a legacy, non-mobile web portal using a desktop computer. The new app saves significant time for data entry and creates efficiencies by validating data prior to entering the workflow review.

The app was built entirely in-house by PennDOT's Mobile App Development Team. Using agile scrum methods, production-ready software was deployed every four weeks in cycles called "sprints". Business and IT staff worked collaboratively, allowing users to provide feedback quickly and regularly, ensuring the end-product met user requirements. The app does not simply duplicate existing forms, it re-engineered and automated the entire process and made entering data more intuitive and accurate in comparison to the previous paper-based and electronic processes. The team delivered a final product in just six months that was embraced by the user community with a very high degree of customer satisfaction.

The ePayroll Mobile App and the associated ePayroll Web Workflow App deployed to a pilot team in December 2017. The cost to develop the app was approximately \$830,000. Between March 2018 and May 2018, the project team traveled to all 11 PennDOT engineering districts to conduct 48 training sessions for the statewide rollout to 1,444 end-users. Training was tailored for Maintenance Foreman, Assistant Highway Maintenance Managers (AHMMs), Roadway Program Coordinators (RPCs) and Payroll Clerks, with an emphasis on minimizing culture shock with the modern technology. As of April 2019, the end-users utilizing the ePayroll app process expanded to a total of approximately 2,177. The payroll rejection rates have dropped drastically from 84% to 28% and the resulting efficiencies are estimated at approximately \$7.5 million per year.

According to PennDOT Secretary Leslie Richards, "Our ePayroll application ensures that our maintenance team has more time to make improvements on our roadways and spend less time on paperwork. While a lot of technology enhancements tend to focus on large or new business needs, this project shows that improving even daily administrative tasks can have significant time and cost savings."

Concept

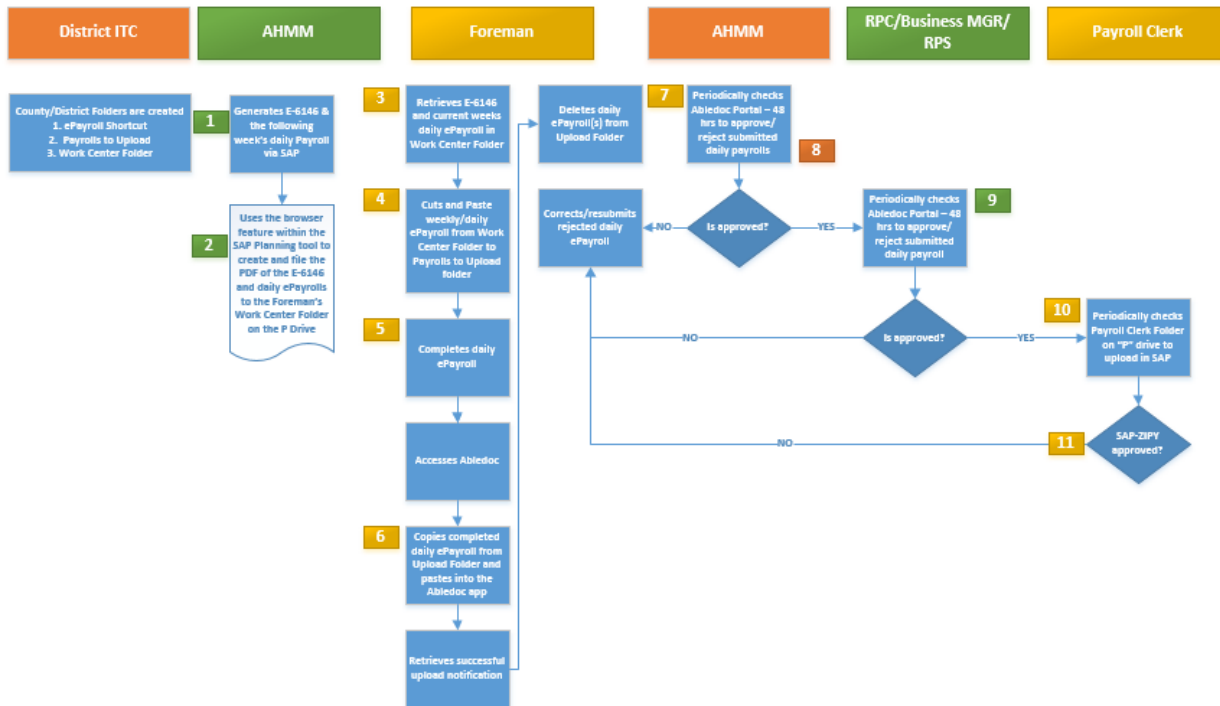
The ePayroll Mobile App represents a significant leap forward in the accurate and efficient processing of payroll and other information reported from job sites throughout the state. Highway foremen used to be required to complete daily paper payrolls for their teams. It could then take several days until the payrolls would be received by the County Office where back office payroll clerks would then have to enter the handwritten payroll sheets into the ERP system on a desktop computer. This double entry process introduced the possibility for data entry errors, as the handwritten sheets were often difficult to read or decipher, leading to data integrity issues and subsequent payroll adjustment transactions.

In an attempt to improve upon the paper-based process, PennDOT began using a third-party website portal that utilized the document management system built into the ERP system and being used for the commonwealth's invoice processes and human resources application.

The process started with the PennDOT Assistant Highway Maintenance Managers (AHMM) using a set of custom System Applications Products (SAP) tools to dispatch Work Orders to create a Highway Weekly Summary Plan, along with daily payrolls for their crews. To provide the documents to the Maintenance Foremen each week, the District IT Coordinators created three separate folders on the PennDOT network drive. Each foreman then cut and pasted his/her daily payrolls to their assigned Work Center Folder. The daily payroll was often completed at the stock pile after the shift had ended using a shared desktop computer where there was Wi-Fi connectivity. Upon completion of the daily payroll, each Foreman would sign and upload his/her daily payroll into the third-party system. Upon successful upload, it became the official daily payroll. Each Foreman then deleted the document from his/her Payrolls to Upload folder.

The third-party website portal was the means of approving and tracking changes to the highway payrolls using automated workflow logic. All AHMMs would see workflow items for review within their county by periodically logging into the system. The AHMM had the option to approve or reject the daily payroll. The Roadway Program Coordinator (RPC), Business Manager and Roadway Program Technician (RPT) Supervisor received payrolls from the AHMM with the status "Approved. Rejected payrolls with comments were returned to the appropriate Foreman to correct and resubmit.

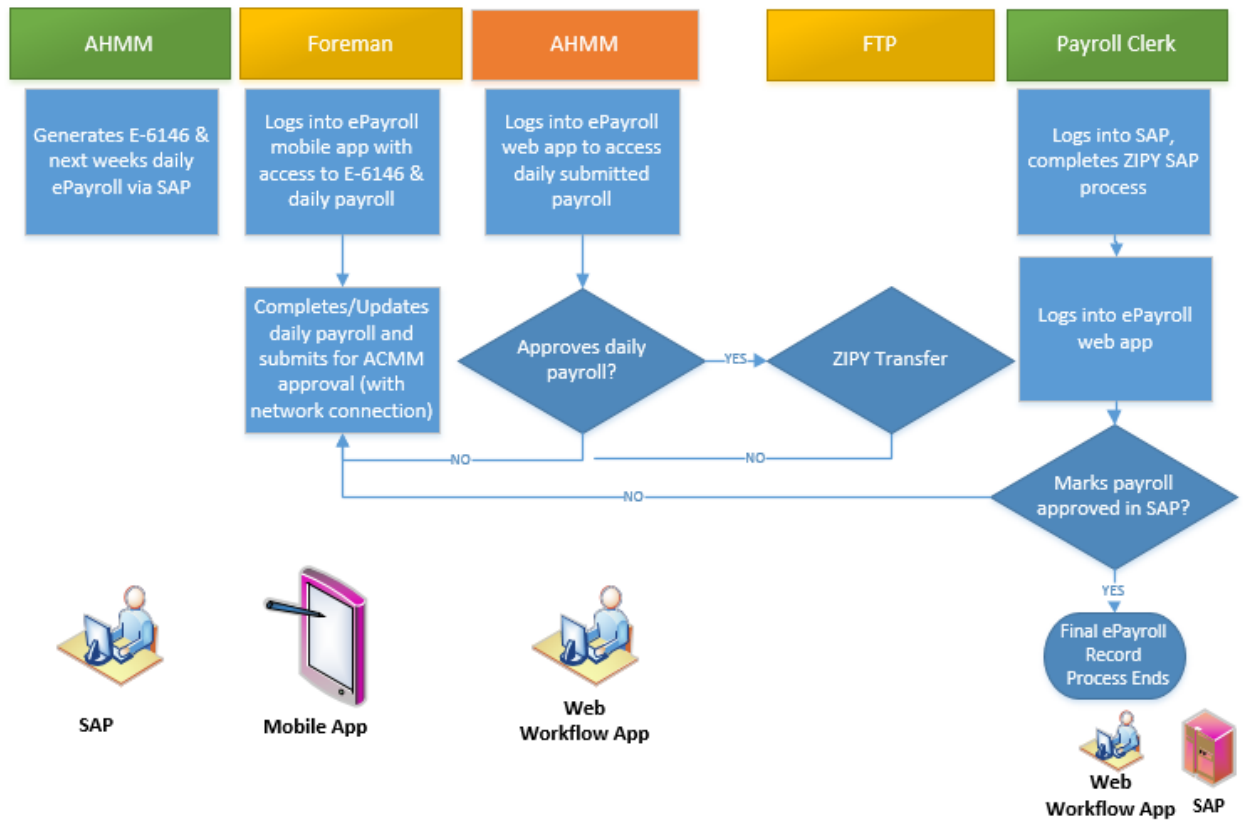
Continuing the workflow process, RPCs, Business Managers and Road Program Technicians (RPS) Supervisors would see workflow items for review by periodically logging into the system. Upon their approvals, an automated download (known as the SAP-ZIPY file) of the payroll was made to the PennDOT network drive, which triggered the Payroll Clerk workflow to begin. The Payroll Clerk would upload the payroll within 48 hours of the payroll date. Rejected payrolls or issues with the SAP-ZIPY file were returned to the Foreman to correct and resubmit. Overall, this process was extremely cumbersome and inefficient.



PennDOT highway maintenance executives recognized the excessive overhead this created. Furthermore, the aging document management system software (Abledoc) later went out of maintenance support from the vendor, leading to concerns of using a third-party system that was at the “end-of-life”. Business and IT staff worked collaboratively to address and establish a consistent, automated process to improve the ePayroll process. Together, they established a set of goals to start the ePayroll initiative:

1. Reduce the number of steps needed to capture the required daily payroll data.
2. Minimize possible human errors made in the field.
3. Allow data to be collected without a network connection.
4. Provide devices with cellular and Wi-Fi connection to submit their completed payroll into a newly designed ePayroll Mobile Web Workflow app for review at any given time.
5. Create a newly designed in-house ePayroll Mobile Web Workflow app that would be accessible on multiple browsers, enhancing and streamlining the current process to be more efficient for the users.

The diagram below depicts the solution implemented by the PennDOT Mobile Development Team.



From the inception of the project, the PennDOT Mobile Development team worked closely with the Integrated Enterprise System Team who maintains the current ERP system for the Commonwealth. Business and IT staff worked collaboratively during the development stage of the mobile app by leveraging an agile methodology. This approach allowed users to provide feedback quickly and regularly to ensure the end product met the requirements of all users.

Within six short months, all PennDOT Foremen were assigned a commonwealth-owned iPad deployed within an advanced mobile device management security framework to ensure information and data security. Utilizing the assigned mobile device, the PennDOT Foreman retrieves his/her assigned Highway Weekly Summary plan along with his/her daily payroll upon authentication of the ePayroll Mobile app. Upon completion of the daily payroll, the PennDOT Foreman signs and synchronizes (syncs) the daily payroll. Upon a successful sync, the payroll is available in the newly designed ePayroll Mobile Web Workflow app for review and approvals.

The ePayroll Mobile Web Workflow app tracks changes to the highway payrolls using an automated workflow logic. All AHMMs access their workflow items for review within their county by periodically logging into the ePayroll Mobile Web Workflow system, where they have the option to approve or reject the daily payroll. Rejected payrolls with comments are returned to the Foreman to correct and resubmit utilizing the ePayroll Mobile app.

Upon final approval of in the review process, the payroll data is then transferred to Integrated Enterprise System (IES) in an XML format via a secure File Transfer Protocol (FTP). IES retrieves the XML file and loads it to the ERP for the Payroll Clerk to complete the SAP-ZIPY process and a successful ERP upload ends the ePayroll Mobile/Web Workflow app process.

"E-payroll has made the payroll process almost fun again," commented Richard Hubler, a Highway Foreman in Columbia and Montour Counties. "It is much, much more user friendly than [the previous system] and is very easy to teach to others. I am personally computer challenged but do not dread the daily process like before. It has sped the process along and is full of useful tools and features such as searching for employees and equipment. Good job to those who developed this program."

Significance

After many years of having to work with inefficient manual, paper-based solutions and sub-optimal electronic solutions, the ePayroll Mobile App represents the realization of a modern, mobile technology solution that is truly transformative and solves a long-standing problem in processing payrolls for the PennDOT highway maintenance foremen and their crews.

Now, the daily payrolls are completed more accurately and quickly using data-driven menus within the ePayroll mobile app and sent electronically at the end of every work shift for automatic upload to the ERP, thereby eliminating the need for the payroll clerks to manually enter all of the payroll data (personnel, materials, equipment). The substantial time savings gained through this initiative has allowed PennDOT to redirect a large portion of the maintenance staff's workday from what could be considered duplicative effort to now performing higher-level, higher-priority tasks.

The ePayroll Mobile App solution aligns with 5 of 10 of NASCIO's 2019 State CIO Priorities.

1. Security and Risk Management – The app was built using a mobile environment and infrastructure that incorporates a modern security framework, along with advanced device management to ensure data and device security.
2. Consolidation/Optimization – The new mobile app provides all 11 of PennDOT's engineering districts with a centralized, standardized method for creating payroll data for highway maintenance teams.
6. Budget and Cost Control – The app reduces costs by greatly improving the efficiency of the payroll process and significantly reducing data entry errors.
7. Customer Relationship Management – Business area customer confidence has been increased through the success of the application and an effective, user-centric outreach and training program.
8. Enterprise IT Governance – The project required effective cross-agency governance and collaboration across the enterprise in order to be successful. Metrics for the number of payrolls submitted and the rejection rates are being captured and reported to the management teams that make up the IT enterprise governance structure.

Impact

The ePayroll Mobile App Project has greatly improved the operational efficiency of PennDOT's highway maintenance teams. Approximately 2,177 Maintenance Foremen, Assistant Highway Maintenance Managers (AHMMs), Roadway Program Coordinators (RPCs) and Payroll Clerks have been trained and are now using the app as part of their daily operations. Since December 2017, over 225,126 payrolls have been submitted electronically and approved.

Thanks to the automation of the data entry process and pre-validation of data input, previous issues such as improper material coding, improper work assemblies and mathematical errors have been eliminated, thus removing the need for double and triple re-work of previously rejected payrolls. The overall rejection rates have

dropped drastically from 84% to 28%. Our 2,177 end-users have realized time savings of approximately one-half hour per day for a total savings of 139,625 hours annually. Using a blended rate of \$54.11 per hour results in an estimated annual savings of more than \$7.5 million per year.

The success of the ePayroll initiative has served as a model for PennDOT to demonstrate mobile computing solutions with the ERP system and opened opportunities for PennDOT to interact directly with the ERP. This was the first project that required PennDOT and Integrated Enterprise Systems (IES), who are responsible for the commonwealth's ERP System, to collaborate in such a tightly coupled and coordinated manner in order to meet the ambitious technical requirements and schedule of the project. This was a truly interagency project that would not have been possible without the outstanding support, dedication and teamwork of IES and PennDOT to build a dynamic, real-time, two-way interface with the ERP. Working relationships were formed that will be invaluable in future projects and initiatives between the two agencies and delivery centers. The new technologies and processes that were developed as a part of the ePayroll Mobile App project will be leveraged to allow for additional interfaces to the ERP to be built and enable future improvements and efficiencies not only for PennDOT's business areas, but for other state agencies, as well.

Whether engaged in highway construction or maintenance, PennDOT has thousands of workers who spend the majority of their time in the field and are rarely in an office or permanent location. The implementation of mobile technologies and solutions for these previously disconnected workers is helping to make their jobs easier and more efficient. In addition, these mobile solutions are not the systems of record for business transactions, but rather interface to existing backend systems and databases that are the systems of record for highway data. This provides access to a wealth of real-time data that was previously unavailable for reporting and analytics purposes. By once again demonstrating the transformative benefits of moving away from paper-based processes to highly automated processes via a mobile application, the ePayroll Mobile App has paved the way for the future adoption of more mobile applications by our workforce, resulting in even more savings and efficiencies for PennDOT.

"As any business would do, tracking costs and hours of staff and equipment are essential parts of evaluating productivity to look for improvement opportunities or making outsourcing decisions. Prior paper processes and even the older electronic systems were extremely time consuming and tedious to do thoroughly. This tool has been recognized as a huge benefit, easing the necessary data collection process and affording more time to focus on safe, efficient operations. In my 30+ years with PennDOT, I can't recall a more collaborative approach that has yielded a higher volume of internally recognized success," said George McAuley, Deputy Secretary for Highway Administration.